CLAIMS:

1. A method comprising the steps of:

receiving a plurality of satellite signals at a plurality of antennas;

sequentially switching an output of each of said plurality of antennas to a single signal processing path to generate a common additive signal;

providing said common additive signal to each of a plurality of satellite channel processors; and

processing signals from each of said plurality of satellites in a respective one of said plurality of satellite channel processors.

2. The method of claim 1 wherein said step of processing signals from each of said plurality of satellites in a respective one of said plurality of said satellite channel processors further comprises, in each of said satellite channel processors, the step of:

tracking a carrier phase of a satellite signal using a reference signal.

3. The method of claim 2 further comprising the step of:

generating a plurality of phase shift correction signals, each of said phase shift correction signals associated with one of said antennas; and

wherein said step of processing signals from each of said plurality of satellites in a respective one of said plurality of satellite channel processors further comprises, in each of said satellite channel processors, the step of synchronously applying the phase shift correction signal associated with a particular antenna to the reference signal during processing of the component of the satellite signal associated with said particular antenna.

4. The method of claim 3 wherein said antennas are implemented as a horizontal antenna array and wherein said phase shift correction signals ϕ_{ik} for an *i-th* antenna and a *k-th* satellite are calculated according to:

$$\phi_{ik} = (2\pi L_i / \lambda) \cdot (\cos\theta_k \cos\theta_i \cos(\alpha_k - \alpha_i) + \sin\theta_k \sin\theta_i)$$

where

λ is the wavelength of carrier oscillation;

Li is the distance between the i-th antenna and an antenna center;

θi is the elevation angle of a line that connects the antenna center to the i-th antenna;

θk is the elevation angle of the k-th satellite;

αi is the azimuth of a line that connects the antenna center to the i-th element; and

αk is the azimuth of the k-th satellite.

5. The method of claim 3 wherein said antennas are implemented as a vertical antenna array with an antenna center on the vertical axis and wherein said phase shift correction signals ϕ_{ik} for an *i-th* antenna and a *k-th* satellite are calculated according to:

$$\phi_{ik} = (2\pi L_i / \lambda) \sin\theta_k$$

where

λ is the wavelength of carrier oscillation;

L_i is the distance between the *i-th* antenna and an antenna center; and

θ_k is the elevation angle of the *k-th* satellite.

6. The method of claim 1 wherein said step of processing signals from each of said plurality of satellites in a respective one of said plurality of satellite channel processors further comprises, in each of said satellite channel processors, the step of:

tracking a pseudo-random code of a satellite signal using a delay locked loop circuit.

7. The method of claim 1 wherein said step of processing signals from each of said plurality of satellites in a respective one of said plurality of satellite channel processors further comprises, in each of said satellite channel processors, the steps of:

tracking a carrier phase of a satellite signal using a phase locked loop circuit; and

tracking a pseudo-random code of a satellite signal using a delay locked loop circuit.

8. The method of claim 1 further comprising the step of applying a blocking signal to said plurality of satellite channel processors to block the processing of signals from an unwanted satellite.

9. The method of claim 8 wherein said plurality of antennas are arranged as a vertical antenna array and wherein said unwanted satellite is located above a threshold elevation angle relative to said antenna array.

10. An apparatus comprising:

a plurality of antennas;

a switch connected to said plurality of antennas for sequentially switching an output of each of said plurality of antennas to a single signal processing path and thereby producing a common additive signal on said single signal processing path; and

a plurality of satellite channel processors each having an input connected to said signal path for receiving said common additive signal and each for processing signals from a respective one of said satellites.

11. The apparatus of claim 10 wherein each of said plurality of satellite channel processors comprises:

a phase locked loop circuit for tracking a carrier phase of a satellite signal using a reference signal.

12. The apparatus of claim 11 further comprising a phase shift correction module for generating a plurality of phase shift correction signals, each of said phase shift correction signals associated with one of said antennas.

13. The apparatus of claim 12 wherein each of said plurality of satellite channel processors further comprises a phase shifter for receiving said phase shift correction signals and for applying said phase shift correction signals to said reference signal.

14. The apparatus of claim 12 wherein said antennas are implemented as a horizontal antenna array and wherein said phase shift correction signals ϕ_{ik} for an *i-th* antenna and a *k-th* satellite are calculated according to:

$$\phi_{ik} = (2\,\pi L_i / \lambda)\cdot(\cos\theta_k \cos\theta_i \cos(\alpha_k - \alpha_i) + \sin\theta_k \sin\theta_i)$$

where

λ is the wavelength of carrier oscillation;

L_i is the distance between the *i-th* antenna and an antenna center;

θ_i is the elevation angle of a line that connects the antenna center to the *i-th* antenna;

θ_k is the elevation angle of the *k-th* satellite;

α_i is the azimuth of a line that connects the antenna center to the *i-th* element; and

α_k is the azimuth of the *k-th* satellite.

15. The apparatus of claim 12 wherein said antennas are implemented as a vertical antenna array with an antenna center on the vertical axis and wherein said phase shift correction signals ϕ_{ik} for an *i-th* antenna and a *k-th* satellite are calculated according to:

$$\phi_{ik} = (2\,\pi L_i / \lambda) \sin\theta_k$$

where

λ is the wavelength of carrier oscillation;

L_i is the distance between the *i-th* antenna and an antenna center; and

θ_k is the elevation angle of the *k-th* satellite.

16. The apparatus of claim 10 further comprising a blocking module for generating a blocking signal and providing said blocking signal to said plurality of

satellite channel processors to block the processing of signals from an unwanted satellite.

17. The apparatus of claim 16 wherein said plurality of antennas are arranged as a vertical antenna array and wherein said unwanted satellite is located above a threshold elevation angle relative to said antenna array.

18. An apparatus comprising:

a plurality of antennas for receiving a plurality of satellite signals;

means for sequentially switching an output of each of said plurality of antennas to a single signal processing path to generate a common additive signal;

means for providing said common additive signal to each of a plurality of satellite channel processors; and

a plurality of satellite channel processors, each for processing signals from a respective one of said plurality of satellites.

19. The apparatus of claim 18 wherein each of said satellite channel processors further comprises:

means for tracking a carrier phase of a satellite signal using a reference signal.

20. The apparatus of claim 19 further comprising:

means for generating a plurality of phase shift correction signals, each of said phase shift correction signals associated with one of said antennas; and

wherein each of said satellite channel processors further comprises means for synchronously applying the phase shift correction signal associated with a particular antenna to the reference signal during processing of the component of the satellite signal associated with said particular antenna.

21. The apparatus of claim 20 wherein said antennas are implemented as a horizontal antenna array and wherein said means for generating a plurality of phase

shift correction signals ϕ_{ik} for an *i-th* antenna and a *k-th* satellite calculates said phase shift correction signals according to:

$$\phi_{ik} = (2\pi L_i / \lambda) \cdot (\cos\theta_k \cos\theta_i \cos(\alpha_k - \alpha_i) + \sin\theta_k \sin\theta_i)$$

where

λ is the wavelength of carrier oscillation;

L_i is the distance between the *i-th* antenna and an antenna center;

θ_i is the elevation angle of a line that connects the antenna center to the *i-th* antenna;

θ_k is the elevation angle of the *k-th* satellite;

α_i is the azimuth of a line that connects the antenna center to the *i-th* element; and

α_k is the azimuth of the *k-th* satellite.

22. The apparatus of claim 20 wherein said antennas are implemented as a vertical antenna array with an antenna center on the vertical axis and wherein said means for generating a plurality of phase shift correction signals ϕ_{ik} for an *i-th* antenna and a *k-th* satellite calculates said phase shift correction signals according to:

$$\phi_{ik} = (2\pi L_i / \lambda) \sin\theta_k$$

where

λ is the wavelength of carrier oscillation;

L_i is the distance between the *i-th* antenna and an antenna center; and

θ_k is the elevation angle of the *k-th* satellite.

23. The apparatus of claim 18 wherein each of said satellite channel processors further comprises:

means for tracking a pseudo-random code of a satellite signal using a delay locked loop circuit.

24. The apparatus of claim 18 wherein each of said satellite channel processors further comprises:

means for tracking a carrier phase of a satellite signal using a phase locked loop circuit; and

means for tracking a pseudo-random code of a satellite signal using a delay locked loop circuit.

25. The apparatus of claim 18 further comprising:

means for of applying a blocking signal to said plurality of satellite channel processors to block the processing of signals from an unwanted satellite.

26. The apparatus of claim 25 wherein said plurality of antennas are arranged as a vertical antenna array and wherein said unwanted satellite is located above a threshold elevation angle relative to said antenna array.